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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/904,458	07/16/2001	Takayuki Murakoshi	010893	8102

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EXAMINER

LUU, THANH X

ART UNIT

PAPER NUMBER

2878

DATE MAILED: 09/24/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/904,458

Applicant(s)

MURAKOSHI ET AL.

Examiner

Thanh X Luu

Art Unit

2878

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 June 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11, 13, 14, 17, 18, 20, 21 and 23-25 is/are rejected.
- 7) ☒ Claim(s) 12, 15, 16, 19, 22 and 26 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 July 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

This Office Action is in response to amendments and remarks received June 25, 2003. Claims 1-26 are currently pending.

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the lights deployed in line-shapes must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 3, 5, 13 and 23 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. It appears that an embodiment in which the cream solder is shaped generally as a truncated pyramid is new matter. Nowhere in the specification or the figures does it mention or show cream solder in a

pyramidal shape (in which the sides of the solder are planar). Figure 4b simply shows an inclined side of a truncated cone (see Figure 3, the solder is round in shape).

Examiner reminds Applicant that no new matter can be added.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 2, 4, 6 and 16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 2, "the inclined portion" lacks proper antecedent basis. Further, it is unclear in its given context if a side inclined portion is different from an inclined portion.

Regarding claims 2, 4 and 6, "two bright/dark images" lacks proper antecedent basis. Further, it is unclear in its given context if the images obtained are the two bright/dark images.

Regarding claim 16, "the substrate" lacks proper antecedent basis.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1, 4, 7-11, 17, 18, 20, 21, 24 and 25 are rejected under 35 U.S.C. 102(e) as being anticipated by Ludlow et al. (U.S. Patent 6,201,892).

Regarding claims 1, 10 and 11, Ludlow et al. disclose (see Figure 10) an inspection method for cream solder for determining (see column 5, lines 50-60) whether or not the shape of the cream solder is appropriate, comprising: irradiating (with 92 and 20) the cream solder alternately (see Figure 17; step 420 and step 450) from at least two illumination directions opposing each other (92 illuminates left; at least part of 20 illuminates right), each of the illumination directions being substantially perpendicular to a viewing direction (down from 30); obtaining images (see Figure 17; "first image", "second image") along the viewing direction, the images corresponding to respective irradiations in the illumination directions; and obtaining a difference (see Figure 17; step 470) between the obtained images. Ludlow et al. further disclose (see Figure 10) illuminating from segments of lights deployed in a ring-shape (24), the ring shape comprise four segments (see Figure 2).

Regarding claims 7, 17 and 18, Ludlow et al. disclose (see Figure 10) an inspection apparatus for cream solder, comprising: a camera (30) disposed above a printed circuit board (14) which is a subject of the inspection; lighting means (92, 20) disposed to irradiate in a lateral direction of the cream solder (12) applied to the printed circuit board and for irradiating light to the cream solder in two directions opposing each other alternately (see Figure 17); arithmetic operating portion which obtains a difference of luminance between at least two images of a side inclined portion of the cream solder photographed with the camera by alternately turning on the light means (see Figure 17);

and determining portion for deciding whether or not the shape of the cream solder is appropriate by comparing the difference of luminance of a side inclined portion of the solder with a preliminary set reference value (see column 12, lines 40-50). Ludlow et al. further disclose (see Figure 10) the lighting means comprises lights deployed in a ring-shape (24), the ring shape comprise four segments (see Figure 2).

Regarding claims 8, 20 and 21, Ludlow et al. disclose (see Figure 10) an inspection apparatus for cream solder, comprising: a camera (30) disposed above a printed circuit board (14) which is a subject of the inspection; lighting means (92, 20) disposed to irradiate in a lateral direction of the cream solder applied to the printed circuit board and for irradiating light to the cream solder in two directions opposing each other alternately; image processing means (see Figure 9) for determining dimensions and area; arithmetic operating means for computing an amount (size) of solder from the dimensions and area determined; and control means (see Figure 7 and 17) provided with a program for inspecting the shape of the solder to control the apparatus. Ludlow et al. further disclose (see Figure 10) the lighting means comprises lights deployed in a ring-shape (24), the ring shape comprise four segments (see Figure 2).

Regarding claims 4, 9, 24 and 25, Ludlow et al. disclose (see Figures 10 and 17) an inspection apparatus, comprising: a camera (30) disposed above a printed circuit board (14) which is a subject of the inspection; lighting means (92, 20) disposed to irradiate in a lateral direction of non-soldered portions of the printed circuit board and for irradiating light to the non-soldered portion in two directions opposing each other alternately (see Figure 17); and arithmetic operating portion which switches the lightning

means to obtain a difference between at least two images taken with the camera and removes the non-soldered portion (see Figures 15 and 17). Ludlow et al. further disclose (see Figure 10) the lighting means comprises lights deployed in a ring-shape (24), the ring shape comprise four segments (see Figure 2).

8. Claims 5 and 14 are rejected under 35 U.S.C. 102(e) as being anticipated by Ngoi et al. (U.S. Patent 6,525,331).

Regarding claims 5 and 14, Ngoi et al. disclose (see Figure 5) an inspection method for cream solder, comprising: irradiating light onto the cream solder from at least two illumination directions opposing each other (from L1 and L5) alternately (see Figure 8) through a lighting means (grating) so as to obtain at least two images, each of the illumination directions being substantially perpendicular to a viewing direction (into the figure); calculating a difference (see equation 12) between the two images to gain information (a height) about a side inclined portion of the cream solder and then determining whether or not the shape of the cream solder is appropriate based on the information about the side inclined portion (see column 6, lines 52-59). Ngoi et al. also disclose (see Figure 6) the lights deployed in line-shapes.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 13 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ludlow et al.

Regarding claims 13 and 23, Ludlow et al. disclose the claimed invention as set forth above. Ludlow et al. do not specifically disclose the solder is shaped generally as a truncated cone. However, it is well known in the art that solder comes in many different shapes and sizes. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to apply the apparatus of Ludlow et al. to any desired solder shape to provide for solder inspection.

Allowable Subject Matter

11. Claims 12, 15, 16, 19, 22 and 26 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

12. Applicant's arguments have been fully considered but they are not persuasive.

Applicant asserts that Ludlow et al. do not disclose irradiating the solder alternately from at least two illumination directions opposing each other, the illumination directions being substantially perpendicular to a viewing direction. Examiner disagrees. As understood, Ludlow et al. do disclose the claimed limitation. In Figure 10 of Ludlow et al. the solder is alternately irradiated with light from illumination directions (96 and 26) opposing each other. Further, it is clearly shown from the figure that the illumination directions are substantially perpendicular to a viewing direction (96a).

Applicant also asserts that Ludlow et al. do not disclose irradiating from a lateral direction. Examiner disagrees. From Figure 10, it is clear that illumination (96 and 26) is lateral (coming from the side) with respect to the solder.

Applicant further asserts that Ngoi et al. do not disclose irradiating light from opposed directions. Examiner disagrees. Since one light source (L1) is on a left side and another light source (L5) is on a right side, as understood, the irradiating lights are opposed.

Thus, as set forth above, this rejection is proper.

Conclusion

13. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanh X. Luu whose telephone number is (703) 305-0539. The examiner can normally be reached on Monday-Friday from 6:30 AM - 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta, can be reached on (703) 308-4852. The fax phone number for the organization where the application or proceeding is assigned is (703) 308-7722.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

txl
September 22, 2003



Thanh X. Luu
Patent Examiner